

# **Logic:**

## **A Brief Introduction**

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## **Foreword**

Welcome! This text is designed to introduce you to the basic concepts of logic and to develop your skills in applying these concepts.

To get started, perhaps I need to ask a very basic question, namely, “Why do we need to study logic anyway?” Now I know that you might be thinking that there is no need to study logic because everybody already knows what it means to be “logical” and what it means to be “illogical.” Indeed I have little doubt that the word “logic” is well entrenched in your vocabulary. Clearly, you know perfectly well what it means to say of someone, perhaps even of yourself, that he or she, is not very logical. I am also aware that you have some important models of what it means to be logical or illogical. For example, you probably associate “being logical” with someone like Mr. Spock (of Star Trek), who is portrayed as being guided more by logic than Captain Kirk, who is portrayed as all too human. You may take this contrast to put logic in a rather bad light. You might associate it with mechanistic, cold, robotic calculation and as opposed to human emotions and feelings.

At the same time, I am confident that “logic” or “being logical” carries some value for you. You may even think, as many do, that one of the greatest things about us as human beings is that we can reason things out, make sound judgments, and act on our reasoning. Indeed, you may even think, again as many do, that our human capacity for reasoning, for being logical, is what separates us, at least in part, from our animal brothers and sisters. In any case, it is pretty safe to say that there is hardly a soul who would want to live without this capacity to reason, and to reason well. Accordingly, my task here, in part, is to enhance your appreciation for our capacity for logical thinking. But I do aspire to more than this: this course is intended to make you a sharper, better thinker.

Well of course you are already well equipped with some logic skills. You can tell when someone has blatantly contradicted herself. For example, if someone were to say that it is a bad thing to hate other people and then, in the same breath, to say it is a good thing to hate people who feel otherwise, we would have no trouble seeing that this person has contradicted herself. Sometimes, however, the mistakes we make in logic are not so obvious. It is these mistakes that we need to be aware of, and it takes some study in logic to gain this awareness. Let us start out with some simple examples that may show how the study of logic does have some practical value.

Let’s set the context for these examples. Suppose that a young man is sitting by the phone awaiting a call from his girlfriend. He knows this much is true: “if she loves me, she will call me before midnight.” Now he thinks of four possibilities:

1. She loves me
2. She does not love me.
3. She calls me before midnight.
4. She does not call me before midnight.

He can construct four different arguments. These are as follows:

### Argument # 1

*If she loves me, then she will call me before midnight.  
She calls me before midnight  
Therefore, she loves me.*

### Argument # 2

*If she loves me, then she will call me before midnight.  
She loves me.  
Therefore, she will call me before midnight.*

### Argument # 3

*If she loves me, then she will call me before midnight.  
She does not call me before midnight.  
Therefore, she does not love me*

### Argument #4

*If she loves me, then she will call me before midnight. .  
She does not love me.  
Therefore, she does not call me before midnight.*

Now, can you tell which of these arguments, if any, is (are) good? In your analysis, keep in mind that in these arguments we are assuming that the first two sentences are true. Of course they may not be true, but **if they were true**, which conclusion would be warranted and which not?

I suspect that your intuitions will not be sufficient to guide you in this analysis. But I could be wrong. In any case, even if your analysis of these arguments is correct, you may not know why you are correct. By the end of this course you will know.

Oh, so you want to know which of these arguments are good and which are not? OK, Arguments #2 and #3 are good whereas arguments #1 and #3 are not. In fact, these forms of reasoning, good and bad, are so common, that they have been given names.

Argument #1 is not good and called "**The Fallacy of Affirming the Consequent.**"

Argument #2 is good and called "**Modus Ponens.**"

Argument #3 is good and called "**Modus Tollens.**"

Argument #4 is not good and called "**The Fallacy of Denying the Antecedent.**"

If you are having trouble seeing that arguments # 2 and #3 are good and that arguments #1 and #4 are bad, just change the content of the argument. For example, let the first statement be: "If I go to the movies then I will see Jane." Then ring the changes on the possible second sentences. That is, combine the first statement with "I do or do not go the movies," and with "I do or do not see Jane."

Very well then, let's get started. Before we do, however, I want to give you just one friendly piece of advice that will help you make your trek through this course successful. The advice is captured in that old joke about the visitor in New York who asked someone on the street, "How do you get to Carnegie Hall?" The reply was: "Practice, practice, practice." Well, that is my advice to you. I have included lots of exercises so that you can get lots of practice. So keep up with your assignments. If you do, you should have smooth sailing. Bon Voyage!